

## Preventing Falls on Stairs

The **stairs** in your home—the ones you climb up and down every day—can be dangerous. A large portion of Canadians who visit hospitals after a fall on or from stairs or steps in their homes are seniors (men and women 65 years or older). When seniors fall, the consequences can be severe and long-lasting.

Most of the falls on or from stairs can be prevented. Prevention starts by keeping in mind that there are risks when people use stairs. Good planning and simple strategies can help everyone prevent falls and injuries.

This *About Your House* tells you about some of the ways you can reduce the risk of falling on or from stairs.

### WHERE CAN YOU FALL?

You can fall anywhere in your house where there are stairs, including the entry stairs, stairs leading to another floor, the back doorstep or steps leading to another room. Falls resulting in serious injuries can occur even with a single step.

### WHY DO PEOPLE FALL?

Professionals who study why people fall on or from stairs say health, environmental and behavioural reasons are contributing factors.

*Health factors* include eyesight problems, frailty, drowsiness, loss of balance and an inactive lifestyle.

**Bolded** terms throughout this fact sheet are defined in the “Glossary” text box on page 9 and are illustrated in Figures 1 and 2.

*Environmental factors* include poor design, construction and maintenance of stairs; nonexistent or dysfunctional **handrails**; poor lighting; and other visual features of stairs such as **tread** surfaces.

*Behavioural factors* include lack of concentration, carrying something while using stairs, unsuitable footwear, unfamiliarity with the stairs (although most stair-related injuries occur on stairs with which the fall victim is familiar) and decisions whether or not—and how—to modify or maintain the **stairway** environment.

### WHAT ARE THE CONSEQUENCES OF FALLING ON STEPS OR STAIRS?

Falls on stairs can be a major threat to health, independence and confidence. The physical consequences can be serious, including soft-tissue damage and broken bones—especially hips. Other serious consequences—particularly for older people—can be psychological effects, such as lowered confidence and a loss of a feeling of safety, which might further reduce healthful mobility and activity. Many people never fully recover from the consequences of a fall.

### SHOULD YOU STOP USING STAIRS?

Not usually. Your doctor can best advise you if you have special health problems that might limit or even prevent you from using stairs. However, it does mean always being aware that stairs can be risky and knowing how to reduce the risks.

There can be health benefits to using stairs. According to Health Canada's *Stairway to*

*Health Program*<sup>1</sup>, activities like climbing stairs significantly contribute to the 30 minutes of physical activity we all need every day. Stair climbing increases leg power and may be important in helping elderly people reduce the risk of injury from falls.

### WHAT CAN YOU DO TO OVERCOME PROBLEMS WITH STAIRS?

There are several ways to reduce the health, environmental and behavioural risks of stairs.

If you feel you have problems related to health factors, such as difficulty going up or down stairs, you should consult an occupational therapist. An occupational therapist can advise you on the most appropriate changes to your home, your behaviour, or both, to meet your own needs. If, following this, you continue to feel you have problems, consult your family doctor.

If you have problems related to health factors which impede you from using stairs, consider the following three options:

1. Installing an elevator or stair lift (see CMHC's *About Your House* fact sheet *Accessible Housing by Design—Lifts and Residential Elevators*).
2. Creating a bedroom, bathroom and laundry room on the ground floor (if not already available) so that you can carry out all your daily activities without having to use stairs.
3. Moving to a one-floor house or apartment.

For environmental and behavioural factors, there are many ways to make stairways in your home safer. Tables 1 and 2 provide some ideas to help you improve your safety by making the stairway as safe as possible (modifying the stairway environment) and by modifying the manner in which you use the stairs (modifying your behaviour). Talk about these ideas with your family members and care providers, and determine which are best for your home, your budget and the way you live.

<sup>1</sup> Canada. Public Health Agency of Canada, *Welcome to the Stairway to Health* (Ottawa: Public Health Agency of Canada, 2007), retrieved September 2, 2010, from <http://www.phac-aspc.gc.ca/sth-evs/english/index-eng.php>.

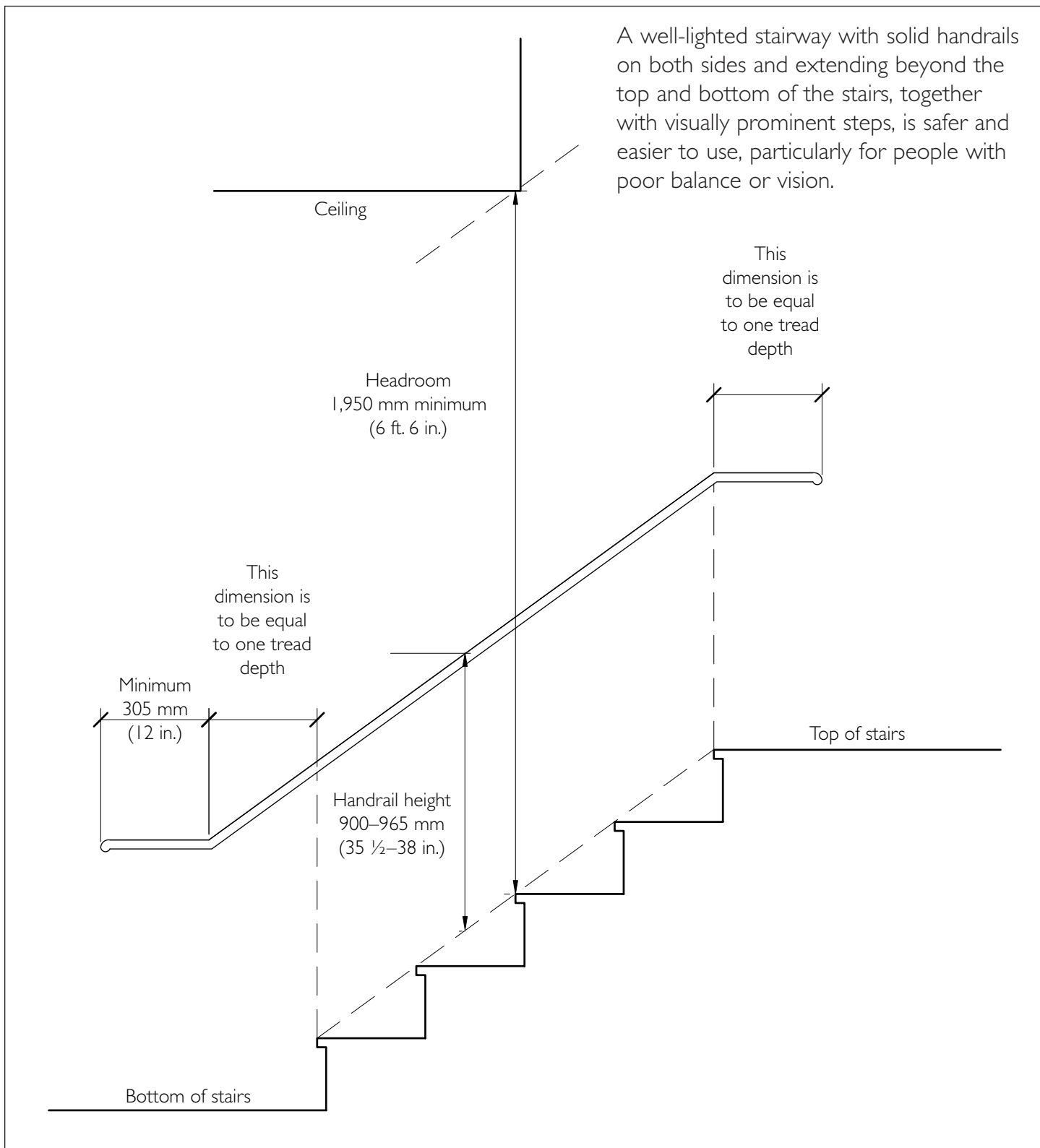


Figure 1 Suggested dimensions for the elements of a stairway

Table 1 Preventing falls by modifying the stairway environment

What causes people to fall?		Strategies to prevent falls
Difficult-to-see steps, especially when it is hard to distinguish one step from another		<ul style="list-style-type: none"> <li>■ Avoid visually distracting patterns on the treads.</li> <li>■ Mark <b>nosings</b> permanently (not with tape) if they can't be clearly seen. Paint a contrasting colour stripe on the nosing of each tread. A painted stripe works very well and looks good even on carpet.</li> <li>■ Improve lighting (see below).</li> </ul>
Poor lighting that causes people to misjudge presence and exact location of each step		<ul style="list-style-type: none"> <li>■ Improve lighting on steps and stairs. Stairs should not have lower illumination levels than adjacent areas.</li> <li>■ Use lighting that makes tread nosings distinctly visible and does not cause glare or strong shadows.</li> <li>■ Install a light switch at both the bottom and the top of the stairs.</li> <li>■ Provide low-intensity night lighting of stairs that does not need to be switched on.</li> </ul>
Step geometry	Steep steps with high <b>risers</b> and/or short <b>treads</b>	<ul style="list-style-type: none"> <li>■ Keep tread coverings thin and tightly affixed to maximize usable tread size. This will usually require removing cushioning under carpets on steps. Soft treads, especially when short and with a large rounding at the nosing, should be avoided.</li> <li>■ If you are renovating the stairs in your current home, or building a new home that has stairs, consider the relationship between the <b>rise</b>, the <b>run</b> and the <b>tread</b> (see Figure 2 on page 7). Professionals that study stairs advise that a rise not higher than 180 mm (7 in.) with a run not shorter than 280 mm (11 in.) provide increased comfort and safety.*</li> </ul>
	Non-uniform steps—an especially common cause of missteps and falls	<ul style="list-style-type: none"> <li>■ Sight along the nosings to confirm that they line up exactly. If they do not, consider partial or complete rebuilding of the steps to make them of uniform size and height. This is very important!</li> </ul>
	Winding or curved stairs	<ul style="list-style-type: none"> <li>■ Provide handrails on each side of the stairway, especially where the stairway includes combinations of rectangular and tapered treads which require users to move from larger to smaller tread depths, depending on where one walks on the stair width.</li> </ul>

Slippery or poorly maintained treads	<ul style="list-style-type: none"> <li>■ Use a slip-resistant, rough finish on treads that are subject to wetting. Generally for interior stairs, any slip-resistant surface material acceptable for normal floors will work on treads (see CMHC’s <i>About Your House</i> fact sheet <i>Accessible Housing by Design—Living Spaces</i> for more information about slip-resistant flooring).</li> <li>■ Repair or replace tread surfaces.</li> <li>■ Fasten tread coverings securely. The covering should be tight against the nosing. Resilient safety tread coverings must be carefully installed and maintained because they tend to crack at the nosing and become an additional hazard.</li> </ul>	
Loose rugs	<ul style="list-style-type: none"> <li>■ Do not place loose rugs on steps, or at the top or bottom of stairways.</li> </ul>	
Handrails	Missing or dysfunctional handrails	<ul style="list-style-type: none"> <li>■ Handrails are strongly recommended regardless of the number of steps. Where possible, install functional handrails on both sides of stairs.</li> <li>■ If there are existing handrails which are decorative but not functional, these should be augmented or replaced by functional handrails.</li> <li>■ Position handrails at about adult elbow height: 900 to 965 mm (35 ½ to 38 in.) works well for older adults who use the handrail for support (see Figure 1).</li> <li>■ An adult should be able to wrap his or her hand around—and underneath—the handrails. If you wrap a measuring tape around the railing, it should measure less than 160 mm (6 ¼ in) for adult hands; 100 mm (4 in.) works well for children’s hands.</li> <li>■ Extend the handrails, without a break, the full length of the stairs, and beyond the top and bottom of the stairs (see Figure 1).</li> <li>■ Ensure handrails have a tactile indicator that warns users that the stair is coming to the end.</li> <li>■ Make sure the handrails are easy to see, even in low light or at night.</li> </ul>
	Loose or broken handrails	<ul style="list-style-type: none"> <li>■ Attach handrails securely to walls and posts. You should be able to put your entire weight on the handrail without damaging the handrail, the wall or the post.</li> <li>■ Repair loose or broken handrails.</li> </ul>
<p>*The National Building Code of Canada permits a maximum (200 mm [7 ¾ in.]) and a minimum (125 mm [5 in.]) <b>rise</b>; a maximum (355 mm [14 in.]) and a minimum (210 mm [8 ¼ in.]) <b>run</b>; and a maximum (355 mm [14 in.]) and a minimum (235 mm [9 ¼ in.]) <b>tread</b> depth; as well as a minimum <b>headroom</b> of 1,950 mm (77 in.) along the length of the stairway in homes. There are cost and design implications of different step geometries which you should always discuss with your builder or renovator, and local building code authority.</p>		

Table 2 Preventing falls by modifying your behaviour

What causes people to fall?	Strategies to prevent falls
Overstepping stair treads (the most common misstep on home stairs) or twisting your feet or body on relatively short treads or windings stairways	<ul style="list-style-type: none"> <li>■ Be cautious, deliberate and not rushed.</li> <li>■ Hold on to the handrails.</li> </ul>
Rushing, especially on steep, curved or cramped stairs	<ul style="list-style-type: none"> <li>■ Take time and be extra cautious, especially where there is a transition between angled, shorter treads on winding stairways and rectangular treads.</li> </ul>
Wearing loose slippers or other footwear	<ul style="list-style-type: none"> <li>■ Always wear shoes or slippers that fit properly and that have a non-slip sole.</li> </ul>
Unintended use of stairs in your home, for example, by vulnerable users, such as small children or older persons with dementia	<ul style="list-style-type: none"> <li>■ Secure gates, at top and bottom of stair <b>flights</b>, to prevent unintended use of the stairs.</li> </ul>
Unfamiliarity with the environment. For example, visiting a relative or friend’s home where there is one or more steps between floors that are at slightly different levels	<ul style="list-style-type: none"> <li>■ Take extra time when using an unfamiliar stairway and be especially wary of all places where changes of floor level are possible—especially with only one or two steps in settings that are visually distracting.</li> </ul>
Lack of attention, for example, when going down stairs; some people fall at the second last step because they think they have already reached the bottom of the stairs	<ul style="list-style-type: none"> <li>■ Avoid being distracted when using a stairway.</li> <li>■ Make sure that your perception of the stairway is accurate, especially in beginning or ending your use of a stairway.</li> </ul>
Poor or impaired vision	<ul style="list-style-type: none"> <li>■ Remove your reading glasses when you climb up or down stairs.</li> <li>■ If you have prescription eyeglasses for distance vision, always wear them when using the stairs.</li> <li>■ Take extra care when wearing bifocal or progressive eyeglasses. Adjust the position of your glasses or your head so you can see the stairs clearly.</li> </ul>
Unnecessary use of stairs, especially under difficult circumstances (for example, rushing up or down stairs to answer the telephone, use the washroom or answer the doorbell)	<ul style="list-style-type: none"> <li>■ Take your time when using the stairs, particularly when going down the stairs.</li> <li>■ Install a telephone on each floor or carry a portable telephone.</li> <li>■ Install a bathroom on each floor.</li> <li>■ Install an intercommunication system which you can use from anywhere in your home.</li> </ul>

<p>Side effects of medication or alcohol</p>	<ul style="list-style-type: none"> <li>■ Make sure you know the effects of medicines. If a medicine can cause dizziness, be extra careful using the stairs.</li> <li>■ Even one alcoholic beverage can affect your balance and perception: be extra careful on stairs if you've had a drink.</li> </ul>
<p>Not using lights</p>	<ul style="list-style-type: none"> <li>■ If stairs are darker than surrounding areas, switch on stair lights.</li> </ul>
<p>Not holding the handrails</p>	<ul style="list-style-type: none"> <li>■ When walking up or down stairs, always hold the handrails, or have at least one hand within easy reach of a handrail.</li> </ul>
<p>Carrying objects on the stairs</p>	<ul style="list-style-type: none"> <li>■ Never carry objects, such as large laundry baskets, on stairs, especially if they require use of both hands or block your view of the steps. Instead, consider using a laundry bag, for example, that can be carried in one hand, dragged or thrown down the stairs.</li> <li>■ One hand should always be left free to hold on to a handrail—and for some more vulnerable stair users, both hands should always be available for handrail use, especially when going down stairs.</li> </ul>
<p>Cleaning the stairs without taking proper precautions</p>	<ul style="list-style-type: none"> <li>■ Use small, lightweight tools or equipment such as a hand-held, cordless vacuum cleaner and always keep one hand on, or available for, the handrail.</li> <li>■ If you polish uncarpeted stairs, always use non-glare, non-skid wax.</li> <li>■ If necessary, have someone else clean the stairs.</li> </ul>
<p>Leaving, or storing, objects on steps or <b>landings</b> (an important problem that is easily avoided)</p>	<ul style="list-style-type: none"> <li>■ Do not place any objects on steps, and make sure that any objects on landings do not distract or obstruct.</li> </ul>

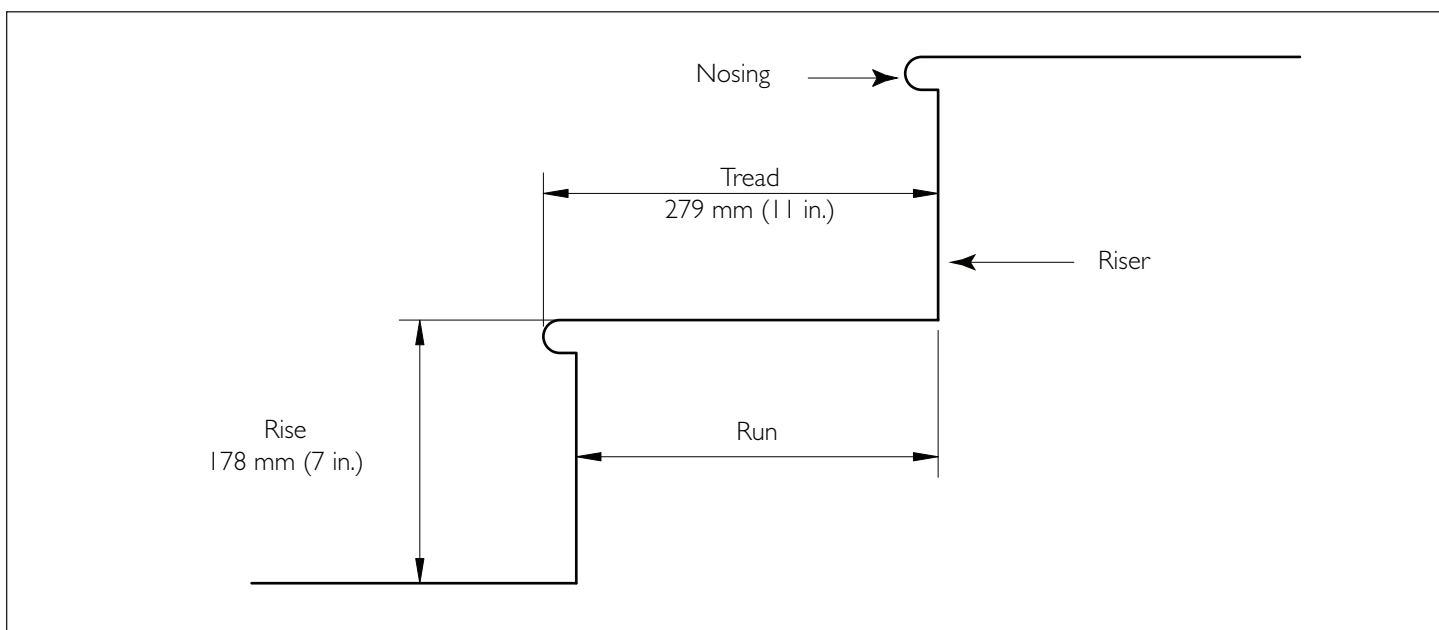


Figure 2 Suggested dimensions for the elements of a step



## CMHC PUBLICATIONS AND PROGRAMS

### Publications for seniors

#### *Maintaining Seniors' Independence Through Home Adaptations: A Self-Assessment Guide*

This guide identifies the types of difficulties seniors can experience in their homes and describes adaptations to overcome these difficulties. Checklists are provided to help seniors assess their own needs. Each checklist deals with an activity in the home, such as getting in and out of the home, using the bathroom, and doing the laundry. The guide will be of interest to seniors, their family members, and caregivers (order no. 61087).

#### *At Home With Alzheimer's Disease: Useful Adaptations to the Home Environment*

This publication describes a variety of practical and low-cost physical adaptations that can be made to a private house or apartment to address the needs of persons with Alzheimer's Disease and their caregivers (order no. 60849).

### Financial assistance programs

You may be eligible for government assistance with the costs of some of the modifications to the stairway environment under the following programs. In some areas of the country, funding for renovation programs is provided jointly by the government of Canada and the provincial or territorial government. In these areas, the provincial or territorial housing agency is generally responsible for delivery of the program. Program variations may also exist in these jurisdictions.

#### *HASI—Home Adaptations for Seniors' Independence Program*

This program offers assistance in the form of a forgivable loan of up to \$3,500 for minor home adaptations that will enable low-income seniors with age-related physical issues to continue living independently in their home. The household income must be at or below the established income threshold for the geographic location of the property.

For more information about financial assistance programs, or to order publications, visit CMHC's website at [www.cmhc.ca](http://www.cmhc.ca).

#### *RRAP-D—Residential Rehabilitation Assistance Program for Persons with Disabilities*

This program offers financial assistance to homeowners and landlords to undertake modifications to eliminate physical barriers and imminent life safety risks related to the property in order to improve the ability of a person with a disability to meet the demands of daily living within their home. To be eligible, the household income and house value must be at or below established ceilings for the geographic location of the property and the dwelling must be occupied or intended for occupancy by a person with a disability. For rental properties, the rent charged must be at or below the median market rent established for the area.



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## Glossary

**Flight:** A set of steps in a stairway.

**Handrail:** A railing intended for grasping by the hand and located parallel to, and usually at the side of, the stair. A functional handrail serves several purposes including providing visual indicator of the stair, assistance with normal balance and—most critically—the only reliable means to arrest a misstep and fall.

**Headroom:** The vertical distance from the outer edge of the nosing line to the underside of the ceiling above.

**Landing:** A platform between flights, or at the beginning or end of a stairway.

**Nosing:** The front or leading edge of a stair tread. In most home stairs, it projects over the tread below.

**Rise:** The vertical height of a step.

**Riser:** The vertical component of a step. There are two types of risers: closed risers (where the back vertical portion of the step is solid) and open risers (where the back vertical portion of the step is open). Closed risers are preferable because they prevent visual distractions.

**Run:** The horizontal distance measured from riser to riser.

**Stair:** A change of elevation consisting of one or more risers or steps.

**Stairway:** Includes stairs, landings and handrails.

**Tread:** The horizontal part of a step.

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**Priced Publications**

*FlexHousing™: Homes That Adapt to Life's Changes* Order No. 60945  
*Housing Options for People with Dementia* Order No. 60967

**Free Publications**

*At Home with Alzheimer's Disease: Useful Adaptations to the Home Environment* Order No. 60849  
*Maintaining Seniors' Independence Through Home Adaptations: A Self-Assessment Guide* Order No. 61087

**About Your House** fact sheets

"Accessible Housing by Design" series

*Appliances* Order No. 65080  
*Bathrooms* Order No. 65686  
*Fire Safety for You and Your Home* Order No. 66091  
*Home Automation* Order No. 65889  
*House Designs and Floor Plans* Order No. 66093  
*Kitchens* Order No. 65588  
*Lifts and Residential Elevators* Order No. 65542  
*Living Spaces* Order No. 66095  
*Ramps* Order No. 65023  
*Residential Hoists and Ceiling Lifts* Order No. 65544  
*Garden Suites* Order No. 65009  
*Home Maintenance Schedule* Order No. 63218

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